which would carry the gas to the dome in half a second. The average time the gases remain in this chamber as computed from their average temperature in the stove will be about five seconds. The volume of gases formed each second in the combustion chamber is

4.31X5.404 = 23 m^3 29 with 40 per cent excess air,
4.75X5.404 = 25 m^3 67 with 80 per cent excess air,

which would make the average area of the ascending column less than 0 m^2 70 or less than 20 per cent of the combustion chamber area. The gas shoots across the short diameter of the chamber and strikes the wall with considerable force. As a result of these conditions, the flame in the combustion chamber may take on a resonant vibration similar to that of the " singing flame " of the physical laboratory.

The mushrooming of the burner jet is one of the causes for the flame coming out around the burner. The hot column of blazing gas will rise through the stagnant gases in the combustion chamber and, since convection currents for gas are readily set up there will be considerable recirculation. Noisy burning is a well-known feature of stove operation. The mushrooming of the gas jet assists in the mixing, and further mixing is effected when the gases reach the dome. Mr. Maccoun's test proved that unburned gases reached the dome but did not pass down into the checkerwork.

The draft conditions existing in a stove are peculiar, inasmuch as there may happen to be a greater draft depression at the chimney valve than at the foot of the stack. This arises from the fact that upward pressure exists in the combustion chamber and likewise, to a lesser extent, in the checker, and these pressures counterbalance each other. Assuming for the sake of simplicity that the waste gases, etc., have the same specific

weight as air, the upward pressure in the combustion chamber will be

$$Ai2\ oo = 23.101.29 \sqrt{\frac{}{1+at/}} = +26.20 \text{ mm of water.}$$

In the checker this upward pressure will be

$$= 26.10/1.29$$

2X273